

**Commonwealth of Kentucky  
Division for Air Quality**

***PERMIT STATEMENT OF BASIS***

FEDERALLY ENFORCEABLE CONDITIONAL MAJOR DRAFT PERMIT

No. F-05-021

The Valvoline Company

Ashland, Kentucky

FEBRUARY 21, 2005

JOSHUA J. HIGGINS, REVIEWER

SOURCE I.D. #: 21-119-0110

SOURCE A.I. #: 40443

ACTIVITY #: APE20040001

**SOURCE DESCRIPTION:**

The Valvoline Company operates an Automotive Products Application Laboratory (APAL) in Boyd County, Kentucky, with the primary purpose of running automotive engine tests to evaluate how engine fluids perform under operating conditions. The facility was established in 1953. None of the engines are operated with a catalytic converter attached because a converter would interfere with the testing process by affecting the backpressure experienced by the engine. As a result of the lack of a catalytic converter, pre-1975 emission factors from AP-42, Volume II, Appendix H were used to ensure conservative estimates from the engines. The automotive engines in the test facility are operated for varying time periods in order to test the performance of lubricants and similar materials. The engines are not operated twenty-four hours per day, and it is unlikely that testing schedules would result in all the engines operating at the same time.

The Valvoline Company is also applying to install and operate an Air Sparge/Soil Vapor Extraction (AS/SVE) system at the site to remedy dissolved phase hydrocarbon-impacted soil and groundwater. The sparging network will consist of two sets of three sparge points installed to a depth of approximately 40 feet. The sparging will typically occur at a low flow rate of approximately 4 scfm per sparge point at 5 psig, however the air sparge compressor is capable of delivering 110 scfm at 15 psig. Sparging will be applied alternately between sets of sparge points. The SVE points will be installed to a depth of approximately 30 feet, and, through use of a vacuum pump, will remove VOC's from the unsaturated soils and recover sparged air. The extracted vapor/water mixture will be routed through a knock out tank to remove moisture, and the vapor through a carbon adsorber to reduce HAP emissions. Accumulated water in the knock out tank will be pumped to a hold tank for periodic disposal.

**CREDIBLE EVIDENCE:**

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.

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FESOP, APE20040001 (Log # 54428)

**COMMENTS:**

Background Information:

Significant and insignificant equipment and activities at The Valvoline Company include the following:

- 7 Unleaded gasoline powered test engines
- 1 Unleaded gasoline powered engine test stand (currently no engine installed)
- 2 Diesel powered test engines
- 1 Leaded gasoline powered test engine (NASCAR racing engine)
- AS/SVE remediation system (Proposed)
- 8 Underground storage tanks (UST's)
- 1 Skid mounted storage tank (500 gal) for leaded gasoline
- 2 Skid mounted storage tanks (550 gal each) for diesel fuel (supply Boilers)
- 4 Diesel fuel boilers (0.4 mmBtu/hr) for space heat
- 12 Natural gas fired space heaters
- 5 Metal cleaning degreasers/parts washers
- 2 Honing machines
- Maintenance activities associated with engine repair
- Lab fume hoods
- Induced draft cooling water tower
- Bead Blaster (self-contained, sand-blaster type equipment except used glass beads)

Type of control and efficiency:

Type: Carbon Adsorber (nonregenerable)

Model: Vapor Pac

Manufacturer: Calgon

Description: Two granular activated carbon beds (approx. 1800 lbs each).

Date constructed: 2005 (Anticipated)

A Carbon Adsorber with an estimated control efficiency of 99% will be constructed and used to control emissions of volatile organic compounds (VOC) and hazardous air pollutants (HAP) from the AS/SVE.

Emission factors and their source:

The emissions for all the storage vessels are based on U.S. EPA's TANKS 4.0 program. To calculate HAP emissions from the tanks, VOC emissions were multiplied by the vapor weight percent of each HAP vapor present as reported by U.S. EPA's Speciate 3.2 program. The output from this program was provided in the application

To determine the emissions associated with the Test Engines, the U.S. EPA's AP-42, Volume II, Appendix H automobile emission factors were used (Table 1.1A.1 for Light Duty Gasoline Powered Vehicles was used for Engines III, IV, VIII, and VE; Table 3.1A.1 for Light Duty Gasoline Powered Trucks was used for Engines V, BL-2, and VI; Table 4.1A.1 for Heavy Duty Gasoline Powered Vehicles was used for the NASCAR Engine; and Table 7.1.1 for Heavy Duty Diesel Powered

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Vehicles was used for Engines ISB, and 1). To calculate HAP emissions, the VOC emission factor is multiplied by the vapor weight percent of each HAP vapor present in the fuel combusted as reported by U.S. EPA's Speciate 3.2 program. The output from this program was provided in the application.

The AS/SVE emission factors were back calculated from potential emissions from the remediation activity. Potential emissions were calculated from the results of a pilot test conducted by the facility in 1999 (See application for sample calculations).

Applicable regulations:

401 KAR 59:010, *New Process Operations*, applies to the engine test cells, however the opacity standard is the only applicable standard.

401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies to each process unit which emits or may emit potentially hazardous matter or toxic substances.

Anything unusual about the:

1. Carbon Adsorber Requirements. Requirements from 40 CFR 63 Subpart GGGGG, *National Emission Standards for Hazardous Air Pollutants: Site Remediation*, were used in the permit for the AS/SVE's Carbon Adsorber Operating Limitations, Testing, Monitoring, Recordkeeping, and Reporting Requirements. These requirements are deemed necessary due to the fact that proper performance and operation of the Carbon Adsorber is the key to ensuring compliance with the source-wide emission limits and with 401 KAR 63:020. See Section B of the permit for the actual requirements.
2. Stop Carbon Adsorber use once inlet concentration less than 34 ppmv hydrocarbons.  
In additional information received 03/19/03 and 11/03/04 the source indicated the desire to remove the Carbon Adsorber from the AS/SVE system once the hydrocarbon inlet concentration to the Carbon Adsorber fell below 34 ppmv. The SCREEN3 modeling analysis included with the 03/19/03 submittal and referenced in the 11/03/04 submittal seemed to support this request by indicating that the emissions at that hydrocarbon concentration would not be "harmful to the health and welfare of humans, animals and plants." [401 KAR 63:020, Section 3] However, the source's modeling analysis was conducted on the AS/SVE system only, and did not take into account the emissions of air toxics from other points at the plant. It should also be noted that AS/SVE emissions reported in the application are derived from the results of a pilot test conducted in May 1999, and may be different from emissions experienced under full-blown operations. Therefore, the Division does not feel that adequate evaluation has been done to include removal of the Carbon Adsorber as an Alternate Operating Scenario in the permit at this time. However, the Division would evaluate any additional information submitted regarding this issue after normal operation and testing of the AS/SVE (See Section B of the permit), and a more detailed air toxics evaluation to include the remaining emission points at the plant.
3. Non-applicable Regulations.  
401 KAR 59:185, *New solvent metal cleaning equipment*, and 401 KAR 61:095, *Existing solvent metal cleaning equipment*, do not apply to the metal cleaning degreasers, at least at

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this time. On June 15, 2004, the U.S. EPA revised the National Ambient Air Quality Standard (NAAQS) for Ozone from a 1-hour standard to a more stringent 8-hr standard.

Until revisions to 401 KAR 51:010, *Attainment status designations*, are posted, the Division's practice is to use the U.S. EPA's county designations for determining attainment or non-attainment status. Boyd County, Kentucky, therefore, is considered non-attainment for ozone under Subpart 1 of the new 8-hr standard. The 8-hr ozone Subpart 1 designations were given to areas that had CAA Section 181, Table 1, values less than 0.121 ppm. This concentration corresponded to Marginal non-attainment areas. So, by being designated Subpart 1, the area may be non-attainment, but is better off than even a Marginally non-attainment area. According to the present wording in 401 KAR 59:185 and 401 KAR 61:095 the regulations apply to affected facilities located in non-attainment counties for any classification except Marginal. Therefore, if the regulations do not apply to a Marginal ozone non-attainment county, then they should also not apply to a county with less of an ozone problem than a Marginal ozone non-attainment county. This is subject to change whenever the EPA releases their Phase II guidance to help implement the new 8-hr ozone NAAQS, and whenever the Kentucky Administrative Regulations get updated. However, the EPA Phase I guidance released 04/30/04 said that the Phase II implementation guidance would be issued "within the next several months." Over a year later, the Phase II guidance is still not available in order to make a more precise determination.

**EMISSION AND OPERATING CAPS DESCRIPTION:**

The Valvoline Company has requested numerous voluntary operating and source-wide emission limits to keep emissions under major source thresholds and preclude the applicability of 401 KAR 52:020, *Title V permits*. See Section B of the permit for operating and emission limits pertaining to the individual emission points, and Section D of the permit for the requested source-wide emission limits.

**PERIODIC MONITORING:**

See the permit for Specific Monitoring Requirements, by group.

**OPERATIONAL FLEXIBILITY:**

See the Alternate Operating Scenario listed in paragraph 8, Section B of the permit for the AS/SVE and Carbon Adsorber and alternate operating limits and monitoring requirements as provided in Subpart GGGGG.

## APPENDIX A

### ISCST3 MODELING FOR AIR TOXICS COMPLIANCE WITH 401 KAR 63:020

Appendix A  
ISCST3 Modeling for Air Toxics Compliance

Procedural Summary

- The source's SCREEN3 modeling submitted with additional information to the application indicated that Benzene is the critical pollutant to evaluate in terms of air toxics because of its low PRG value, however, their study only modeled emissions from the AS/SVE system instead of emissions from the entire facility. The Division concurs that Benzene is the critical pollutant to evaluate due to the low toxics reference values (the Division used values from the U.S. EPA's Integrated Risk Information System (IRIS) in its source-wide evaluation).
- Since multiple stacks and Insignificant Activities (i.e.: tanks, and other fugitives) had to be modeled the U.S. EPA's Industrial Source Complex Short Term-3 (ISCST3) model was used. For all of the point sources, the stack data provided in the application was used along with the annual emissions from each stack given by the pollutants of concern (POC) table, and using the 99% removal rate for the Carbon Adsorber (emissions are even lower if the source abides by the 20 ppmv emission limit option for the Carbon Adsorber). For the Insignificant Activities, the total annual benzene emissions for all of the Insignificant Activities as determined by the POC was assumed to be emitted by the above ground leaded gasoline storage tank. This assumption expedited creation of the modeling database, and is not expected to have a significant impact on the modeling results due to the extremely low overall Insignificant Activity benzene emission rate (i.e.: 0.006 tpy). Additionally, the tank was assigned an emission height of just over 1 meter, and in reality, some of the other Insignificant Activities may vent at a height higher than 1 meter which would slightly increase the dispersion rate.
- Since the IRIS reference concentration (RfC) is "An estimate ... of a continuous inhalation exposure to the human population ... that is likely to be without an appreciable risk of deleterious effects during a lifetime," ISCST3 output options were set to generate an annual report for direct comparison to the RfC.
- Modeled results were compared to the U.S. EPA's Reference Concentration (RfC) listed in the Integrated Risk Information System (IRIS) database. Modeling of the source's PTE for benzene produces annual concentrations less than the RfC. In order to compare the source's requested 3.0 tpy limit of benzene to the RfC, a simple ratio was established with the annual emission rates, and the modeled concentration. The ratio was then solved to determine the expected annual concentration if the source were ever to emit 3.0 tpy (See the selected modeling output and table in Appendix B).

## APPENDIX B

### ISCST3 MODELING OUTPUT & RfC COMPARISON